

***Kut* gen. nov., a new troglomorphic spider genus from Turkey (Araneae, Dysderidae)**

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Abstract

A new genus of troglomorphic Dysderidae is described, based mainly on the morphology of copulatory organs. The new genus *Kut* **gen. nov.**, with the type species *Harpactocrates troglophilus* Brignoli, 1978, also includes two recently discovered new species from the coastal Mediterranean Turkey: *Kut izmiricus* **sp. nov.** and *K. dimensis* **sp. nov.** All three species display troglomorphic traits, most distinct in *K. dimensis* **sp. nov.** Another genus-level trait is a characteristic simple type of bulb in males. Female copulatory organ shows similarity to the endemic Caucasian genus *Cryptoparachtes* Dunin, 1992 in paraspermatheca structure, whereas the male copulatory organ is unique among all known Dysderidae.

Keywords

Anatolia, cave-dwelling, endemic, eyeless spider, MSS, troglobite

Introduction

Dysderinae is one of the three subfamilies of the spider family Dysderidae, along with Harpacteinae and Rhodinae. Its members can be clearly distinguished by the unique morphology of sternum and labium joints, as well as by having claw tufts of setae on all tarsi and scopulae on posterior metatarsi (Deeleman-Reinhold and Deeleman 1988).

Subfamily Dysderinae is quite diverse and includes the following genera (number of species given in square brackets): *Cryptoparachtes* Dunin, 1992 [3 spp.]; *Dysdera* Latreille, 1804 [285 spp.]; *Dysderella* Dunin, 1992 [2 spp.]; *Dysderocrates* Deeleman-Reinhold & Deeleman, 1988 [8 spp.]; *Harpactocrates* Simon, 1914 [13 spp.], *Hygrocrates* Deeleman-Reinhold, 1988 [5 spp.], *Parachtes* Alicata, 1964 [13 spp.], *Stalitochara* Simon, 1913 [1 sp.] and *Tedia* Simon, 1882 [2 spp.] (WSC 2019).

Most of the genera of subfamily Dysderinae are endemic to the West Palearctic, with limited ranges. *Cryptoparachtes* and *Dysderella* are Caucasian endemics; *Hygrocrates* has a broader range from the Mediterranean Turkey and Caucasus; *Harpactocrates* and *Parachtes* are West European; *Dysderocrates* is East Mediterranean; and *Tedia* is known from Syria and Israel (WSC 2019). Only the genus *Dysdera* is widespread and mega species-rich, within a range covering the entire Mediterranean basin, all of Eurasia and the Macaronesian Archipelago; however, it includes many narrow endemics in the West Palearctic (Cardoso et al. 2008; Řezáč et al. 2008; WSC 2019).

Many species of Dysderidae are adapted to life in the darkness and display troglomorphic traits (Mammola et al. 2018). Even though most of troglobites belong to subfamilies Harpacteinae and Rhodinae, cave forms are known in Dysderinae as well (Arnedo and Ribera 1999). One of these species, *Harpactocrates troglophilus* Brignoli, 1978, has been described from the Zindan Cave in Mediterranean Turkey (Isparta Province).

Various authors doubted the generic placement of *H. troglophilus*, yet there have not been any attempts for a revision. In his original description, Brignoli (1978) wrote: “I am not entirely sure about the generic position of this strange species, similar in habitus with the *Harpactocrates*, but very different with the bulb (simpler)”. Absence of females was undoubtedly a reason for this hesitation. Later, in their seminal paper, Deeleman-Reinhold and Deeleman (1988) marked this species as “invisae inquirendae” (“not seen, doubtful”). Recently, Bidegaray-Batista et al. (2014) provided a molecular evidence that *H. troglophilus* belongs to a different lineage than monophyletic western Mediterranean *Harpactocrates*, which appeared to be “...more closely related to the eastern Mediterranean Dysderinae genera *Dysderocrates* and *Cryptoparachtes*...”.

This paper aims to contribute to the knowledge of the Dysderinae of Turkey by establishing a new genus based on troglomorphic *Harpactocrates troglophilus* and two other, new species recently discovered in Mediterranean Turkey.

Material and methods

Specimens were collected in different provinces of Turkey, either by hand collecting, pitfall, or MSS (Mesovoid Shallow Substratum) trapping and preserved in 70% ethanol. MSS trap design and application based on López and Oromí (2010) with several modifications to optimize sampling: 80 cm long PVC pipes of 11 cm diameter were used, with many small holes (5–7 mm) drilled along surface, except for 10 cm part at the bottom for preserving a plastic beaker, and a 40 cm part at the top to avoid sampling surface dwellers, enabling sampling between 40 to 70 cm of depth.

Digital images of the left palp and vulva were taken with a Leica DFC295 digital camera attached to a Leica S8AP0 stereomicroscope. Five to 30 photographs were taken in different focal planes and combined using COMBINE ZP image stacking software. Photographic images were edited using ADOBE PHOTOSHOP CS6 and CORELDRAW HOME & STUDENT SUITE X7 was used to create the plates. All measurements are in mm. Terminology for the body parts and copulatory organ structures follows Deeleman-Reinhold and Deeleman (1988) and Chatzaki and Arnedo (2006).

Abbreviations: **AL**, abdominal length; **CL**, carapace length; **CW_{max}**, maximum carapace width; **CW_{min}**, minimum carapace width; **AME**, anterior median eyes; **PLE**, posterior lateral eyes; **PME**, posterior median eyes; **AMEd**, diameter of anterior median eyes; **PLEd**, diameter of posterior lateral eyes; **PMEd**, diameter of posterior median eyes; **ChF**, length of cheliceral fang; **ChG**, length of cheliceral groove; **ChL**, total length of chelicera (lateral external view); **E** embolus; **T** tegulum; **Ms** midspermatheca; **Ps** paraspermatheca; **Ta**, tarsus; **Me**, metatarsus, **Ti**, tibia; **Pa**, patella; **Fe**, femur; **Tr**, trochanter; **C**, coxa; **D**, dorsal; **Pl**, prolateral; **Rl**, retrolateral; **V**, ventral.

Depositories: **AZMM**, Zoology Museum of Alaşehir Vocational School, Celal Bayar University, Manisa, Turkey; **ETZM**, Eskişehir Technical University Zoology Museum, Eskişehir, Turkey.

Taxonomy

Family Dysderidae C. L. Koch, 1837

Subfamily Dysderinae C. L. Koch, 1837

Diagnosis. Sternum edge at labium-sternum joint approximately 2.5–3 times longer than the edges at gnathocoxa-sternum joints. All tarsi with claw tufts.

A key to the genera of Dysderinae

1	Male	2
–	Female	8
2	Distal extensions of tegulum simple.....	3
–	Distal extensions of tegulum complex.....	4
3	Tegulum globular. Embolus long, sinuous. Conductor absent.....	
 <i>Harpactocrates</i> Simon, 1914	
–	Tegulum pear-shaped. Embolus is a simple extension of tegulum	
 <i>Kut</i> gen. nov. (Figs 1D–F, 2D–F, 3D–F).	
4	Distal extensions divided with haematodocha.....	<i>Dysdera</i> Latreille, 1804
–	Distal extensions without haematodocha division	5
5	Tegulum Z-shaped, with two apophyses	<i>Cryptoparachtes</i> Dunin, 1992
–	Tegulum pear-shaped, straight or cylindrical.....	6

6	Tegulum pear-shaped, with two apophyses in addition to hook-shaped embolus.....	<i>Hygrocrates</i> Deeleman-Reinhold, 1988
–	Tegulum cylindrical	7
7	Tip of tegulum with a broad, well-developed, chitinized apophysis.....	<i>Dysderocrates</i> Deeleman-Reinhold & Deeleman, 1988
–	Tip of tegulum with a chitinized but underdeveloped, small apophysis.....	<i>Parachtes</i> Alicata, 1964
8	Anterior spermatheca club-shaped	9
–	Anterior spermatheca not club-shaped	10
9	Dorsal arc well-developed. Posterior diverticulum distinct	<i>Kut</i> gen. nov. (Figs 1G–H, 2 G–H, 3 G–H)
–	Posterior diverticulum indistinct.....	<i>Cryptoparachtes</i> Dunin, 1992
10	Spermatheca with two distinct sections, distal and proximal	<i>Hygrocrates</i> Deeleman-Reinhold, 1988
–	Spermatheca without two distinct sections.....	11
11	Anterior diverticulum arc- or T-shaped	12
–	Anterior diverticulum simple	<i>Harpactocrates</i> Simon, 1914
12	Anterior diverticulum arc-shaped.....	13
–	Anterior diverticulum T-shaped	<i>Parachtes</i> Alicata, 1964
13	Anterior femora without numerous spines	<i>Dysdera</i> Latreille, 1804
–	Anterior femora with numerous spines	<i>Dysderocrates</i> Deeleman-Reinhold & Deeleman, 1988

***Kut* gen. nov.**

<http://zoobank.org/12362EEF-8192-4147-81F7-6170210ED5EA>

Type species. *Harpactocrates troglophilus* Brignoli, 1978.

Derivatio nominis. “*Kut*” is a Turkish word traceable to the old Turkic language with multiple meanings, such as “fortune (good or bad)”, “lifelong energy” or “vigour”, and more, depending on a dialect or a historical period. Gender: masculine.

Diagnosis. The new genus resembles genera *Dysderocrates*, *Harpactocrates* and *Hygrocrates* in the general morphology of the male palp; however, it can be identified by the following characters:

In male copulatory organ of *Kut* gen. nov., tegulum is pear-shaped and embolus is a simple extension of a tegulum. Embolus represents the only distal extension of tegulum, any other apophyses are absent, unlike in *Dysderocrates* and *Hygrocrates*.

In *Kut* gen. nov., female copulatory organ is unique among the majority of *Dysderinae* genera in having the anteriorly located, club-shaped spermathecae, bearing a resemblance to those in *Cryptoparachtes*. *Kut* gen. nov. differs from *Cryptoparachtes* by having a well-developed dorsal arc and a distinct posterior diverticulum, as well as by the male copulatory organ (see Dunin 1992: 42).

Anterior side of sternum (the side touching labium) is much more convex compared to other Dysderinae genera.

Description. Large-sized Dysderinae spiders. Somatic characters as in other Dysderidae. Detailed description see under *Kut troglophilus* (Brignoli, 1978) comb. nov.

***Kut troglophilus* (Brignoli, 1978) comb. nov.**

Figure 1

Harpactocrates troglophilus; Brignoli, 1978: 38, f. 4–5 (D♂).

H. troglophilus; Deeleman-Reinhold and Deeleman 1988: 250, f. 18 (♂, probably misplaced).

H. troglophilus; Le Peru 2011: 286, f. 473 (♂).

Material examined. 11 ♂♂, 9 ♀♀ (ETZM and AZMM), Turkey: Konya Province, Beyşehir District, Kurucaova Town (37°40.483'N, 31°22.700'E), pitfall trap, August–October 2012, leg. E.A. Yağmur & O. Tutar; 1 ♂, Konya Province (ETZM), Beyşehir District, Kurucaova Town (37°40.450'N, 31°22.633'E), MSS trap, 08 August–10 October 2018, leg. E.A. Yağmur.

Diagnosis. The simple structure of male palp in *Kut troglophilus* (Brignoli, 1978) is similar to that in some species of *Harpactocrates*, *Harpactea*, *Parachtes*, and *Stalagtia*. In *K. troglophilus* palp, the bulb gradually gets thinner and eventually gives rise to embolus, with a transition between tegulum and embolus rather indistinct, unlike in the other genera. Another unique feature of this genus is that the tip of the embolus is continuously bent posteriorly. In females, *K. troglophilus* vulva resembles that of the Caucasian genus *Cryptoparachtes*; however, in all three species of the latter (*C. adzhari-cus*, *C. charitonowi* and *C. fedotovi*), spermathecae are club-shaped. Paraspermatheca is distally spherical in all species of *Cryptoparachtes*, whereas in *K. troglophilus* paraspermathecae club shaped and more or less of equal length like the midspermatheca, unlike in three *Cryptoparachtes* species mentioned.

Measurements (♂/♀). **AL** 3.75–4.70/5.00–5.50; **CL** 3.50–4.48/3.50–4.00; **CW** 2.70–3.44/2.70–3.15; **AMed** 0.14–0.18/0.12–0.16; **PLEd** 0.08–0.12/0.07–0.09; **PMed** 0.08–0.11/0.07–0.12; **ChF** 0.95–1.25/0.96–1.05; **ChG** 0.55–0.80/0.60–0.70; **ChL** 1.60–2.10/1.60–1.75.

Description. *Carapace* hexagonal, reddish brown, with a smooth surface. Cephalic region darker than the thoracic region (Fig. 1A). Eyes reduced. Posterior eyes approximately of the same diameter and aligned. Posterior median eyes adjacent, as distant as their diameter to posterior lateral eyes. Chelicera robust, dark brown (Fig. 1B, C). Chelical groove with four teeth, two on pro– and two on retromargin. Among retromarginal teeth, proximal one smaller, distant one larger. Promarginal teeth approximately of the same size, proximal one in alignment with the proximal one of the retromargin.

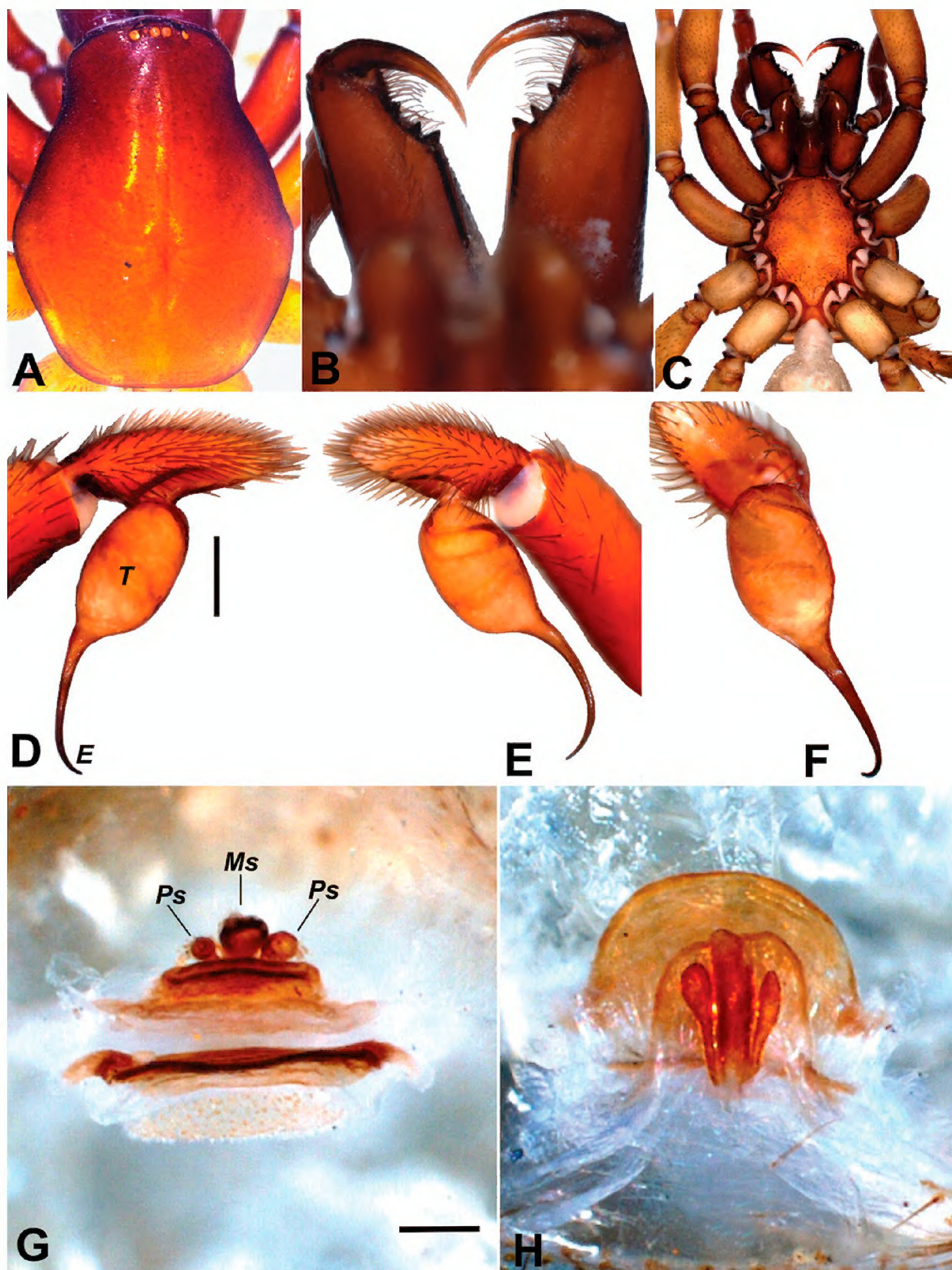


Figure 1. *Kut troglophilus* (Brignoli, 1978) comb. nov. **A** carapace **B** chelicerae **C** prosoma **D** male palp, retrolateral view **E** ditto, prolateral view **F** ditto, nearly retrolateral view **G** vulva, dorsal view **H** ditto, ventral view. Scale bars: 0.5 (**D**), 0.125 (**G**).

Labium and gnathocoxae brown. Anterior sides of gnathocoxae chitinized at borders and dark brown. Labium anteriorly with a V-shaped incision. Sternum yellowish brown. Anterior side of sternum (touching labium) slightly convex (Fig. 1C).

Table 1. Leg measurements of *Kut troglophilus* (Brignoli, 1978) comb. nov (♂/♀).

Legs	I	II	III	IV
C	1.98/1.84	1.80/1.55	1.20/1.00	1.25/1.15
Tr	0.45/0.60	0.50/0.40	0.50/0.40	0.48/0.50
Fe	3.60/3.20	3.35/2.90	2.80/2.50	3.50/3.35
Pa	2.48/2.80	2.40/2.05	1.90/1.40	2.00/1.80
Ti	3.04/2.30	2.95/2.35	2.35/2.00	3.05/2.35
Me	3.04/1.85	3.00/2.25	2.75/2.55	3.50/3.35
Ta	0.95/0.65	0.80/0.70	0.80/0.80	0.90/0.80
Total	15.54/13.24	14.80/12.20	12.30/10.65	14.68/13.30

Table 2. Leg spination of *Kut troglophilus* (Brignoli, 1978) comb. nov.

Legs	I	II	III	IV
Fe	4–6 Pl	1, 1, 2–1, 2 Pl	2–3 D	3–5 Pl 3–5 D
Pa	0	0	1–2 Pl 1–3 Rl	1 Pl 1–2 Rl
Ti	0–1 Pl 0–1 V	0–1 Pl 1–2 V	3–6 Pl 3–7 Rl 1, 1, 2 V	3–6 Pl 3–6 Rl 1, 1, 2 V
Me	0	0	2–4 Pl 4–5 Rl 0–1, 1, 2 V	3–5 Pl 4–7 Rl 1, 1, 2 V

Legs yellowish, light brown. Leg coxa, trochanter, and femora darker in colour at joints. Femora and tibiae I and II prolaterally with spines; number of spines variable among individual spiders. Tibiae I and II with ventral spines. See Tables 1, 2 for details on leg measurements and spination. Abdomen long and slender, greyish cream in colour.

Palp (Fig. 1D–F). Palpal tarsus shorter than tibia, conical. Tarsus and tibia lighter in colour compared to other palp segments. Tegulum cylindrical; embolus originates from the anterior dorsal side of tegulum and is bent posteriorly as an arc. Tegulum and embolus distinctly different in colour.

Vulva (Fig. 1G, H). Midspermatheca club-shaped. Paraspermathecae pin-shaped and similar in size to midspermatheca. Spermathecae surrounded by a dome-shaped chitinized structure. Spermathecae posteriorly with two horizontally aligned bars of equal sizes; of these, one closer to spermathecae is less chitinized than the other.

Note. Brignoli (1978) described *Harpactocrates troglophilus* based on two adult males collected from the Zindan Cave (Isparta Province, Turkey). He also recorded (marked as “cf.”) additional juvenile specimens from three other localities (all from caves), at the close vicinity of the type locality. Our specimens of *Kut troglophilus* (Brignoli, 1978) comb. nov. were collected from one of these localities, Kurucaova Village (Konya Province), close to the İnönü Cave, by both pitfall and MSS traps. Sampling inside the cave yielded no Dysderidae except subadult *Dysderocrates*.

Kut izmiricus sp. nov.

<http://zoobank.org/AE2AA947-3925-4558-A384-685B2368000A>

Figure 2

Material examined. Holotype: 1 ♂ (ETZM), Turkey: İzmir Province, Kemalpaşa District, Vişneli Village, Nif Mountain (38°23.073'N, 27°21.614'E), MSS trap, 01 July–08 September 2015, leg. E.A. Yağmur, P. Mitov, S. Örgel & Ç. Altın. Paratypes: 1 ♀ (ETZM),

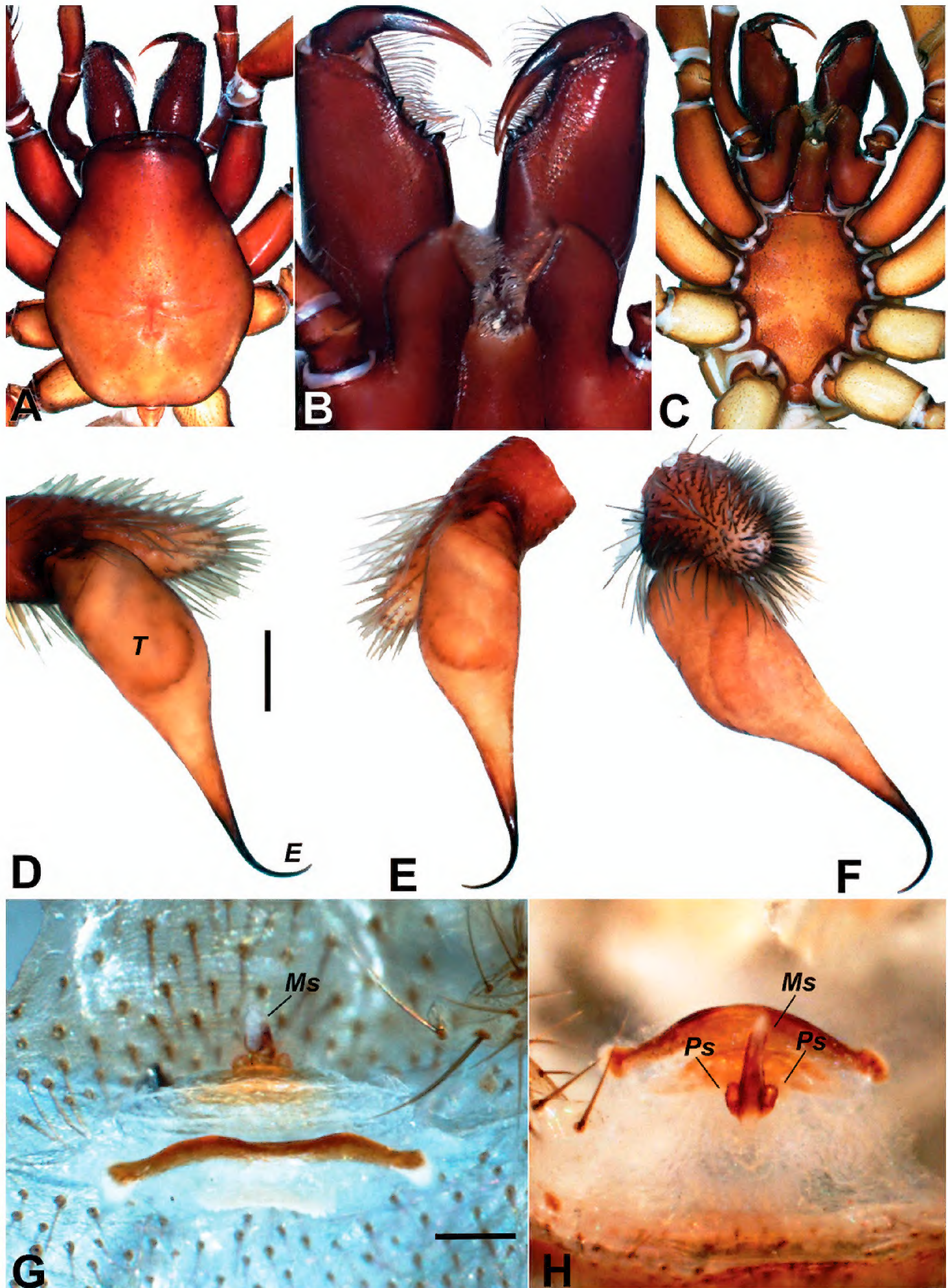


Figure 2. *Kut izmiricus* sp. nov. **A** carapace **B** chelicerae **C** prosoma **D** male palp, retrolateral view **E** ditto, prolateral view **F** ditto, nearly prolateral view **G** vulva, dorsal view **H** ditto, ventral view. Scale bars: 0.5 (**D**), 0.125 (**G**).

3 juveniles, 05 May–01 July 2015, leg. E.A. Yağmur, S. Örgel & S. Yaman, other data same as holotype; 3 subadults ♂♂, 07 September 2015–11 July 2016, leg. E.A. Yağmur, S. Örgel & S. Yaman, other data same as holotype; 1 ♂ (AZMM), 1 subadult ♀, 1 juvenile, 11 July–27 October 2016, leg. E.A. Yağmur, S. Örgel & S. Yaman, other data same as holotype; 1 ♂ (AZMM), 2 subadults ♀♀, 1 juvenile, 17 April–22 October 2017, leg. E.A. Yağmur, S. Örgel & S. Yaman, other data same as holotype; 3 subadults ♂♂ (AZMM), 09 June–20 October 2018, leg. E.A. Yağmur, S. Örgel & S. Yaman, other data same as holotype.

Diagnosis. Male palp of *Kut izmiricus* sp. nov. resembles those of *K. troglophilus* and *K. dimensis* sp. nov.; in *Kut izmiricus* sp. nov. the bulb is more slender and exceeds embolus in length, unlike in the other two species. Female of *Kut izmiricus* sp. nov. differs from others by having a longer midspermatheca.

Derivatio nominis. The specific name is a toponym that refers to the type locality, İzmir Province.

Measurements (Holotype ♂ / Paratype ♀). **AL** 6.56/5.80; **CL** 6.00/5.00; **CW** 4.32/3.60; **AMEd** 0.14/0.11; **PLEd** 0.08/0.10; **PMEd** 0.05/0.08; **ChF** 1.45/1.15; **ChG** 1.00/0.90; **ChL** 3.10/2.25.

Description. *Carapace* reddish brown, with thick dark brown contours at the borders. Fovea distinct, longitudinal (Fig. 2A). Carapace surface with tiny dents; these dents with tiny, black setae inside. These setae are longer in the cephalic region, especially around eyes. Eyes tiny, reduced. Distance between anterior eyes approximately 2.5 times their diameter. Posterior eyes spherical, slightly concave. Chelicera, gnathocoxa, and labium dark brown. The new species resembles *K. troglophilus* by the other chelicer-al traits (Fig. 2B). Sternum brown, covered with setae, and with dark brown contours at the borders. Sternum with eight dark brown blotches, symmetrically reaching from sides toward center. Gnathocoxae with yellowish setae prolaterally at tips (Fig. 2B, C).

Table 3. Leg measurements of *Kut izmiricus* sp. n (Holotype ♂ / Paratype ♀).

Legs	I	II	III	IV
C	2.80/2.15	2.56/2.00	1.50/1.35	1.70/1.25
Tr	0.80/0.50	0.78/0.50	0.60/0.40	0.60/0.50
Fe	5.84/4.25	5.00/3.75	4.40/3.25	5.44/4.20
Pa	3.60/2.70	3.28/2.50	2.16/2.30	2.70/2.25
Ti	4.80/3.25	4.64/3.50	3.50/3.75	4.20/3.75
Me	4.40/3.00	4.32/3.25	4.30/3.50	5.70/4.25
Ta	1.04/0.90	1.04/0.75	0.80/0.85	1.12/1.00
Total	23.28/16.75	21.62/16.25	17.26/15.40	21.46/17.20

Table 4. Leg spination of *Kut izmiricus* sp. nov.

Legs	I	II	III	IV
Fe	11 Pl 5 RI	6 Pl 3 RI	1 D 4 Pl 3–5 RI	5 Pl 1 RI 5 D
Pa	0	0	1 Pl 2 RI	1 Pl 1 RI
Ti	1–2 Pl 0–1 RI 2 V	2–3 V	3 Pl 6 RI 1, 1, 2 V	6 Pl 6 RI 1, 1, 2 V
Me	0	0	1, 1 Pl 5 RI 1, 1, 2 V	4 Pl 5 RI 1, 2 V

Legs brown. Coxae I, II and III darker in colour compared to other leg segments. See Tables 3, 4 for details on leg measurements and spination. Abdomen slender, cylindrical, greyish cream in colour.

Palp (Figs 2D–F). Palpal tarsus shorter than tibia, conical. Tegulum exceeds embolus in length. First half of tegulum cylindrical, second half reversely conical. The anterior side of the tegulum smoothly straight. Embolus short and hook-shaped, bent posteriorly.

Vulva (Fig. 2G, H). Midspermatheca club shaped, very long, its tip transparent and slightly bent posteriorly. Paraspermathecae short, spherical. Posteriorly to spermathecae, two horizontally aligned bars; among these, one closer to spermathecae is shorter, distant one twice as long and more chitinized.

***Kut dimensis* sp. nov.**

<http://zoobank.org/F80CCEC0-AE94-4923-9D39-7DF2E3C72580>

Figs 3, 4

Material examined. Holotype: 1 ♂ (ETZM), Turkey: Antalya Province, Alanya District, Kestel Town, Dim Cave (36°32.405'N, 32°6.603'E), hand collecting from stalactites and stalagmites, 04 January 2013, leg. K.B. Kunt & M. Elverici. Paratypes: 3 ♂♂, 5 ♀♀, 4 juveniles (ETZM), 1 ♂, 1 ♀ (AZMM), same data as holotype.

Diagnosis. Male palp of *Kut dimensis* sp. nov. closely resembles that of *K. troglophilus* (Brignoli, 1978) comb. nov. *Kut dimensis* sp. nov. palp differs by having an embolus with tip sharply bent posteriorly, instead of gradually, and by having a more slender tegulum. Difference between *Kut dimensis* sp. nov. and *K. izmiricus* sp. nov. palps is more distinct, since in *K. izmiricus* sp. nov. tegulum/embolus ratio is higher



Figure 3. *Kut dimensis* sp. nov., female. *In situ* in the Dim Cave (photograph by M. Elverici).

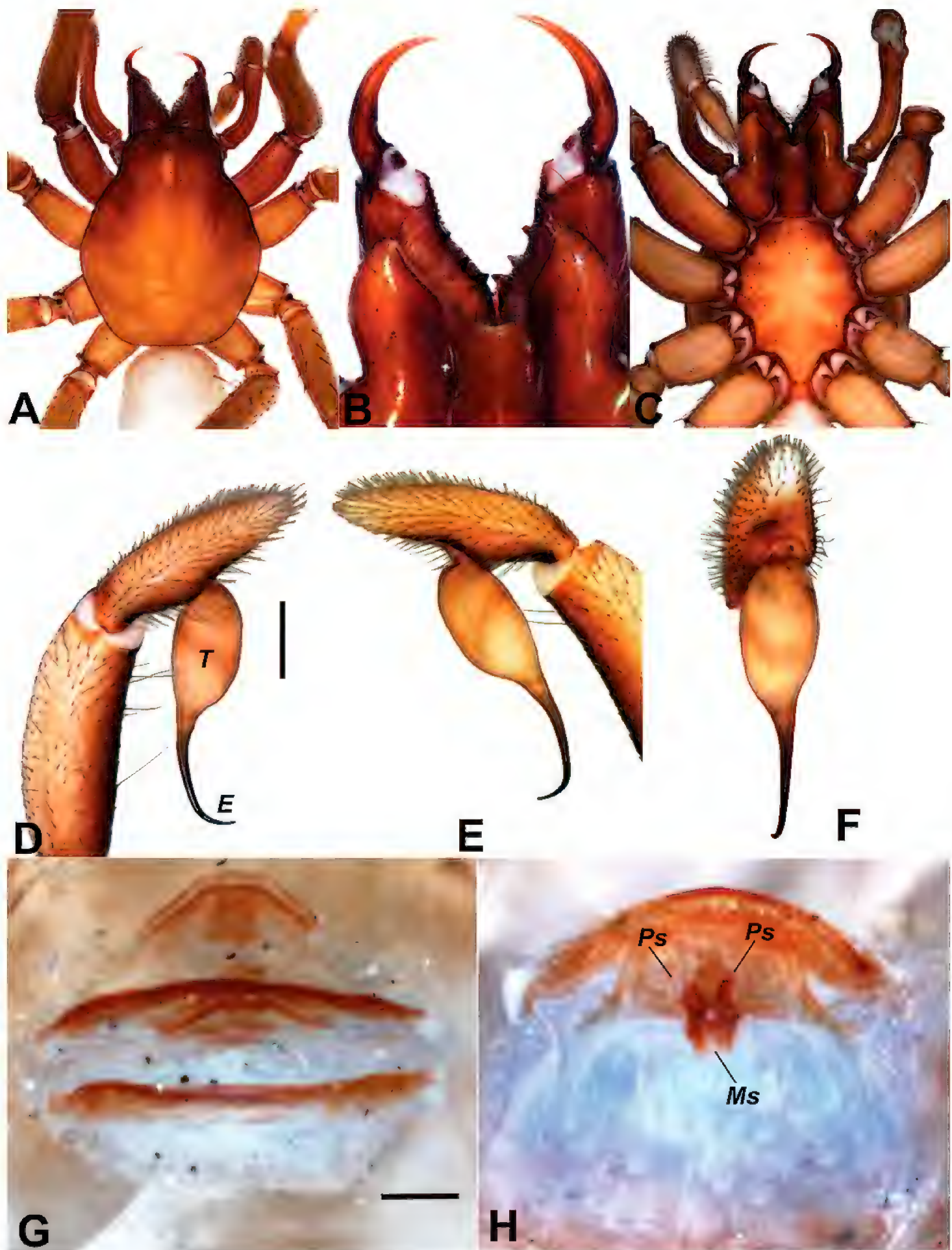


Figure 4. *Kut dimensis* sp. nov. **A** carapace **B** chelicerae **C** prosoma **D** male palp, retrolateral view **E** ditto, prolateral view **F** ditto, nearly anterior view **G** vulva, dorsal view **H** ditto, ventral view. Scale bars: 0.5 (**D**), 0.125 (**G**).

compared to other species of the genus. *K. dimensis* sp. nov. females differ from other species by having longer paraspermathecae compared to midspermathecae, which is the opposite in the other two species.

Derivatio nominis. The specific name is a toponym that refers to the type locality, Dim Cave located at Dim Valley in Alanya District.

Measurements (Holotype ♂ / Paratype ♀). AL 4.25/4.11; CL 4.40/4.25; CW 3.50/3.30; ChF 0.95/1.10; ChG 0.75/0.75; ChL 1.70/2.05.

Description. Somatic traits of *Kut dimensis* sp. nov. resemble the other two species in general. Eye reduction at an extreme level, eyes almost absent (Fig. 4A). Anterior and posteriolateral eyes barely visible only under stereomicroscope, in a state of indistinct spots. Legs more slender than in *K. troglophilus* (Brignoli, 1978) comb. nov. Anterior metatarsi with ventral spines. See Tables 5, 6 for details on leg measurements and spination.

Palp (Fig. 4G, H). Palpal tarsus shorter than tibia, conical. $\frac{3}{4}$ part of embolus continues straight after the separation from the tegulum, then bent with a sharp coil at the 4th quarter, shaped like an “L” towards posterior.

Vulva (Fig. 4G, H). Midspermatheca fingertip shaped, shorter than paraspermathecae. Paraspermathecae pin-shaped. Spermathecae surrounded by a dome-shaped chitinized structure. Spermathecae posteriorly with two lucent, strongly sclerotized, horizontally aligned bars.

Note. *Kut dimensis* sp. nov. is not the first troglomorphic species recorded from its type locality, the Dim Cave. López-Pancorbo et al. (2013) described a troglobiont spider *Kryptonesticus dimensis* (López-Pancorbo, Kunt & Ribera, 2013) (Nesticidae) from the same cave. A cave cricket *Troglophilus alanyaensis* Taylan et al., 2012 (Orthoptera, Rhaphidophoridae) is another endemic species known only from this cave.

The Dim Valley, the valley where the Dim Cave located, has been studied by our team extensively in the recent past. There have been new species of Dysderidae discovered and described like *Harpactea alanyana* Özkütük et al., 2015 and *Harpactea ballarini* Kunt et al., 2013. Furthermore, the locality has been extensively sampled by the first author, as it was covered in his MSc thesis, titled “Harpacteinae Fauna of Antalya

Table 5. Leg measurements of *Kut dimensis* sp. nov. (Holotype ♂ / Paratype ♀).

Legs	I	II	III	IV
C	2.00/1.90	1.75/1.75	1.14/1.10	1.50/1.50
Tr	0.55/0.35	0.35/0.40	0.30/0.45	0.50/0.50
Fe	4.00/4.00	4.30/3.75	3.75/3.50	5.00/4.85
Pa	2.75/2.50	2.80/2.50	1.75/1.75	2.40/2.30
Ti	4.00/3.30	3.60/3.05	3.00/2.00	4.50/4.25
Me	3.50/3.55	3.36/3.60	4.00/3.25	4.85/4.85
Ta	0.75/0.85	0.50/0.80	0.70/0.75	0.90/0.65
Total	17.55/16.45	16.66/15.85	14.64/12.80	19.65/18.90

Table 6. Leg spination of *Kut dimensis* sp. nov.

Legs	I	II	III	IV
Fe	6–9 Pl 3–4 RI	5–7 Pl 0–4 RI	0–3 D 3–8 Pl 4–5 RI	3–4 D 4–6 Pl 3–4 RI
Pa	0	0	1 Pl 3–4 RI 0–1 V	1 Pl 1 RI 0–1 V
Ti	1, 1 V	2–3 V	6 Pl 6 RI 1, 1, 2 V	5–7 Pl 5–6 RI 1, 1, 2 V
Me	1 V	1 V	3–5 Pl 5 RI 1, 1, 2 V	5–6 Pl 6 RI 0–1, 1, 2 V

Province”. We provide these details to point out that *Kut dimensis* sp. nov. has not been found outside of the cave, in surface habitats, despite extensive sampling efforts, which is one of the reasons we consider this species a troglobiont.

Discussion

With the description of *Kut* gen. nov., the number of genera belonging to spider family Dysderidae is now 25. Even though there are other genera known exclusively from hypogean habitats such as caves (for example *Minotauria* Kulczyński, 1903 and *Folkia* Kratochvil, 1970 from Harpacteinae; *Stalita* Schiödte, 1847 from Rhodinae), *Kut* gen. nov. is the first genus of Dysderidae ever discovered, in which all known species display troglomorphic traits such as reduced eyes or hypogean foraging. *Kut troglophilus* (Brignoli, 1978) is currently the only species of the *Kut* gen. nov. with recorded surface activity; however, it was also recorded from hypogean habitats: in MSS with this study and the Zindan Cave (Brignoli 1978). The other two species were recorded either exclusively from caves (*Kut dimensis* sp. nov.) or from MSS (*Kut izmiricus* sp. nov.) (Fig. 5).

With this paper, we have resolved the discussion regarding the generic placement of *Kut troglophilus*. In our opinion, *Kut* gen. nov. has a unique and important position among Dysderidae due to its troglotic and biogeographic affinities, coupled with the unique morphology of copulatory organs.

During our sampling efforts throughout the Mediterranean Turkey by using MSS traps, we have discovered further populations that might very likely belong to *Kut* gen. nov. as well. Moreover, we have collected subadult individuals from central parts of Anatolia with similar morphology, which may indicate a more or less continuous range of the genus throughout the Anatolia. We hope to reveal the specific identity of these



Figure 5. *Kut* gen. nov. distribution in Turkey.

populations, study their relationship to the known Aegean, Mediterranean, and Central Anatolian species, and the relationship between *Kut* gen. nov. and the Caucasian *Cryptoparachtes* in the near future. A high level of endemism of Dysderinae around Anatolia at both species and genus levels indicates that many more taxa are still waiting to be discovered.

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References

- Arnedo MA, Ribera C (1999) Radiation in the genus *Dysdera* (Araneae, Dysderidae) in the Canary Islands: The island of Tenerife. *Journal of Arachnology* 27: 604–662.
- Bidegaray-Batista L, Ferrández MÁ, Arnedo MA (2014) Winter is coming: Miocene and Quaternary climatic shifts shaped the diversification of Western-Mediterranean *Harpactocrates* (Araneae, Dysderidae) spiders. *Cladistics* 30(4): 428–446. <https://doi.org/10.1111/cla.12054>
- Brignoli PM (1978) Ragni di Turchia IV. Leptonetidae, Dysderidae ed Agelenidae nuovi o interessanti di grotte della Turchia meridionale (Araneae). *Quaderni di Speleologia, Circolo Speleologico Romano* 3: 37–54.
- Cardoso P, Borges PAV, Macías-Hernández N (2008) *Dysdera crocata* C.L. Koch, 1838. In: Silva L, Ojeda EL, Rodríguez-Luengo JL (Eds) *Invasive Terrestrial Flora and Fauna of Macaronesia: TOP 100 in Azores, Madeira and Canaries*. ARENA, Ponta Delgada, 415–417.
- Chatzaki M, Arnedo MA (2006). Taxonomic revision of the epigeal representatives of the spider subfamily Harpactinae (Araneae: Dysderidae) on the island of Crete. *Zootaxa* 1169: 1–32. <https://doi.org/10.11646/zootaxa.1169.1.1>
- Deeleman-Reinhold CL, Deeleman PR (1988) Revision des Dysderinae (Araneae, Dysderidae), les espèces méditerranéennes occidentales exceptées. *Tijdschrift voor Entomologie* 131: 141–269.
- Dunin PM (1992) The spider family Dysderidae of the Caucasian fauna (Arachnida Aranei Haplogynae). *Arthropoda Selecta* 1(3): 35–76.

- Le Peru B (2011) The spiders of Europe, a synthesis of data (Vol. 1). Atypidae to Theridiidae. Mémoires de la Société Linnéenne de Lyon 2: 1–522.
- López H, Oromí P (2010) A pitfall trap for sampling the mesovoid shallow substratum (MSS) fauna. Speleobiology Notes 2: 7–11.
- López-Pancorbo A, Kunt KB, Blagoev G, Deltchev C, Ribera C (2013) *Nesticus dimensis* new species, a new troglobitic spider from Turkey (Araneae, Nesticidae), with comments on its phylogenetic relationships. Zootaxa 3721(2): 183–192. <https://doi.org/10.11646/zootaxa.3721.2.5>
- Mammola S, Cardoso P, Ribera C, Pavlek M, Isaia M (2018) A synthesis on cave-dwelling spiders in Europe. Zoological Systematics and Evolutionary Research 56: 301–316. <https://doi.org/10.1111/jzs.12201>
- Řezáč M, Král J, Pekár S (2008) The spider genus *Dysdera* (Araneae, Dysderidae) in Central Europe: Revision and natural history. Journal of Arachnology 35: 432–462. <https://doi.org/10.1636/H06-38.1>
- World Spider Catalog (2019) World Spider Catalog. Version 20.5. Natural History Museum Bern. <http://wsc.nmbe.ch> [accessed on 1.11.2019]

